V. *Additio ad Schedulam De Quadraturis. Autore Johanne Craig.*

IN Actis Philoſophicis Menſis Septembris, Pag. 708. duo exhibui Theoremata ad Figurarum Geometricè irrationalium Quadraturas ſpectantia: utq; Lectori facilior ſit aditus ad hæc & ſimilia inveniendà, tertium jam ſubjungo Theorema, plura (ſi opus fuerit) poſtea exhibiturus.

Sit ergo in Fig. loci memorati ACF Semicirculus, ADE Curva Geometricè irrationalis, cujus ordinatim applicata BD ſecat ſemicirculum in C. Quantitates verò deſignentur ut prius, ſcil. Diameter AF=2a, abſciſſa AB=y, Arcus AC=v, Ordinata BD=z; ſitq; $z=rv^2y^n$ æquatio exprimens Naturas Curvarum ADE, in qua r denotat quantitatem quamlibet datam & determinatam, & n exponentem indefinitum quantitatis indeterminatæ y. Dico Aream

$$ABD=\frac{rv^{2n+1}y}{} - qv^2 + v\sqrt{2ay-y^2}\times\frac{2ra}{n+1|2}y^n + \frac{2ra^2\times 2n+1}{n\times n+1|2}y^{n-1} +$$

$$\frac{aAx2n-1}{n-1}y^{n-2} + \frac{aBx2n-3}{n-2}y^{n-3} + \frac{aCx2n-5}{n-3}y^{n-4} + \frac{aDx2n-7}{n-4}y^{n-5}$$

$$+ \frac{aEx2n-9}{n-5}y^{n-6} \text{ \&c. } - \frac{2ra^2}{n+1|3}y^{n+1} - \frac{2ra^3\times 2n+1}{n^2\times n+1|2}y^n - \frac{a^2Ax2n-1}{n-1|2}y^{n-1}$$

$$- \frac{a^2Bx2n-3}{n-2|2}y^{n-2} - \frac{a^2Cx2n-5}{n-3|2}y^{n-3}, \text{ \&c.}$$

De hoc Theoremate hæc ſunt notanda (1.) Quod componatur ex duabus ſeriebus infinitis, quarum prior (ſigno + connexa) multiplicatur in $v\sqrt{2ay-y^2}$; termini autem poſterioris (ſigno — affecti) ſunt abſoluti. (2) Quod in priori ſerie literæ majuſculæ A, B, C, D, E, &c. deſignent coefficientes terminorum ipſis reſpective præcedentium; nec non in poſteriori eoſdem obtineant Valores, quos in priori. (3.) Quod Quadratura exhibeatur per quantitatem finitam, quando n eſt numerus integer poſitivus, aut nihilo æqualis, vel etiam ſi 2n ſit numerus impar: num in his caſibus utraque Series abrumpitur. 4. Quod 2q ſit æqualis ultimo termino abrumpenti prioris ſeriei.

Exem-

Exemplum 1. Sit $z = \frac{v^2}{a}$. Quia in hoc caſu $n=0, r=\frac{1}{a}$, ideo erit Area $ABD = \frac{yv^2}{a} - v^2 + 2v\sqrt{2ay-y^2} - 2ay$. Corol: Integra figura AFE eſt æqualis duplo Quadrato, cujus Latus eſt ACF; dempto Diametri Quadrato.

Exemp. 2. Sit $z = \frac{yv^2}{a^2}$, quia in hoc caſu $n=1$, $r=\frac{1}{a^2}$, ideo erit Area $ABD = \frac{y^2v^2}{2a^2} - \frac{3}{4}v^2 + v\sqrt{2ay-y^2} \times \frac{y}{2a} + \frac{3}{2} - \frac{1}{4}y^2 - \frac{3ay}{2}$.

Exemp. 3. Sit $z = \frac{y^2v^2}{a^3}$, quoniam in hoc caſu $n=2$, $r=\frac{1}{a^3}$, ideo erit Area $ABD = \frac{y^3v^2}{3a^3} - \frac{5}{6}v^2 + v\sqrt{2ay-y^2} \times \frac{2y^2}{9aa} + \frac{5y}{9a} + \frac{5}{3} - \frac{2y^3}{27a} - \frac{5y^2}{18} - \frac{5ay}{3}$.

Cûm hæc ſcriberem accepi nuperos Menſes Actorum Lipſienſium, in quibus multa egregia ad Geometriam promovendam non ſine ſummâ Voluptate perlegi; ut & alia quædam à clariſs: Leibnitio & Jo. Bernoullio in Methodum meam de Quadraturis notata. In actis ſcil. Anni 1695. Menſ. Aprilis nos certiores facit Leibnitius ſe Methodum habere noſtræ non-nihil ſimilem; & ſane plurimùm gratulor noſtra cum tanti Geometræ cogitatis potuiſſe vel minimam habere ſimilitudinem. Quod vero ait ſuam eſſe meâ univerſaliorem & breviorem, nullus dubito. Optandum eſſet, ut hanc ſuam Methodum, ut & plurima, quæ habet alia, præſertim ad Calculum ſuum differentialem ſpectantia non diutiùs apud ſe premeret, ſed quam primum per otium liceat in commune Rei-publicæ literariæ commodum in lucem emitteret. Speramus verò interim nobis omnia, quæ ad calculum illum perficiendum ſunt neceſſaria, brevi daturum illuſtriſſimum Marchionem Hoſpitalium in parte, per egregii ſui operis poſteriori, quam (in partis prioris præfatione) de calculo Integrali ſe compoſuiſſe ſignificat. Impatienter etiam Sectionem illam alteram expectabimus, in qua Calculi hujus uſum in Phyſicis & Mechanicis ſe oſtenſurum Nobiliſſimus Autor promittit: Omnia enim ab ipſo publicata, tam ſpecimina quæ ſparſim

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in actis Lipſienſibus & alibi reperiuntur, quam præſtantiſſimus ille liber (cui Titulum dedit——— *Analyſe des Infiniment petits*) faciunt ut magna quæq; ab Eruditiſſimo Marchione expectemus.

Quodque ingenioſiſſimo Jo. Bernoullio viſum fuerit (in Actis Anni 1695. Menſibus Febr. & Auguſt:) Methodum meam non eſſe generalem pronunciare, id etiam ego lubens agnoſco, ut exemplorum meorum ſerie facile percipere potuerit Vir acutiſſimus. In materia difficili gradus, quos poteram, feci; & ſi itineris Longitudine vel difficultate deterritus non ulterius tum progreſſus fuerim, mihi tamen (qui obiter tantùm ſtudiis hiſce Mathematicis Animum adhibeo) quà volui, ſiſtere licebat. In quo hæreat Methodus mea partim notavit clariſſ. Bernoullius; rem tamen totam non prorſus aſſequutus videtur. Interim illi me plurimum devinctum habeo, quod ſuâ Animadverſione Tractatum meum dignatus fuerit, multò tamen magis, quod tam candidè, tamq; humanè me ab erroribus meis liberare voluerit.

VI. *A Letter from Mr.* Stephen Gray, *dated* Canterbury, Dec. 8. 1697. *relating ſome Experiments about making Concave Specula nearly of a Parabolick Figure.*

I Had before this time communicated the Experiments I mentioned in the end of my Letter of the 12th of *May* laſt, had I not expected an Opportunity to have made ſome farther Progreſs than I have yet done. I ſhall not ſpend time to tell you how I have been obſtructed in having my Thoughts diverted by other Affairs, yet I think it convenient to let the Society know how far I have proceeded toward the way to make the Concave Specula nearly of a Parabolick Figure, which they will naturally receive, or at leaſt with a very little Aſſiſtance of Art, having the Ambition to think, that if any ingenious Perſon ſhall think fit

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